

THE HISTORY AND CONSTRUCTION OF ELLICOTT MILLS
AT ELLICOTT CITY, MARYLAND

THESIS

Presented to-

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By:

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SUMMARY

Ellicott Mills were started in 1772 and completed in 1774. The founders introduced improvements which justly entitles them to be called, "The real progenitors of modern milling in Maryland." Not only did their plant influence the flour milling industry but it also had far reaching effects on every branch of commerce, industry, and life in Maryland. Today, after ~~the~~ weathering the set backs of two fires and a flood, the mills still operate in a large modern structure, one of the most up-to-date plants in this country.

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AT ELLICOTT CITY, MARYLAND

INTRODUCTION

Ellicott Mills, now known as the Patapsco Flouring Mills, constitute a large modern milling plant situated in the valley of the Patapsco River, ten miles west of Baltimore. Although it uses methods and machinery comparable with those of any flour mill in the United States, and is one of the newest and most modern plants in the eastern section of this country, its history dates back one hundred and fifty nine years to the days when the present state of Maryland was an English Colony and the United States was in the embryonic stage; but a vague dream in the minds of a few American colonists.

The mill was conceived and built at a time when Maryland was in a state of stagnation. Immigration into the colony had practically ceased. Due to the imperfect means of transportation, the absence of manufacturing industries, and the lack of cultivation of the territory's natural resources, the growth of population after 1689 was very slow. All the productive energy of the people was concentrated in the raising of a single crop, tobacco. Consequently few of the luxuries of life and many of its necessities were not available to the colonists. This resulted in the spread of destructive diseases and a high rate of mortality. The founding of Ellicott Mills produced an immediate change, and

its importance can not be overestimated. The agricultural processes, the export trade, the life, manners, and customs of the people, and even "the face of the country" was altered by the Ellicotts and their mill. To the casual observer today the mill is merely an edifice in which the methods of a scientific age are utilized in the production of a necessary foodstuff. But the mill is more than this. It is the trigger that gave impetus to the growth of industries, transportation, and population in Maryland; its life and history are intimately interwoven with the life and history of the people of that state.

HISTORY OF THE MILL

In 1772 three Ellicott brothers; Andrew, Joseph, and John purchased lands and all water rights for a distance of four miles on both sides of the Patapsco River. They emigrated from Bucks County, Pennsylvania, where their family owned a mill, bringing with them all the implements, machinery and workmen that they needed to construct and operate a mill, and at the same time, raise their own wheat. The journey was long and difficult. Part was accomplished over water by ship, and the remainder by hauling over land. During the last stage of the journey it was necessary to carry the luggage by hand. The site selected for the mill was in the center of their four mile tract and in a spot they called,

"The Hollow". This name was amply descriptive of the place. The mill-to-be was flanked on all sides by high granite hills, coated with a wilderness of great, stately trees, and abounding with game. A saw mill was built first, where the lumber for the homes of the workmen and the mill building itself was produced.

At that time wheat was grown only for the personal use of the very rich land owners in Maryland. The land had become sterile from excessive production of tobacco, which was practically the only crop, and was used, almost exclusively, in place of money, as a medium of barter and exchange. The Ellicotts believed that they could raise abundant crops of wheat between the river and the Blue Ridge Mountains, and tried to persuade their neighbors to do the same. This project was looked upon as fanatical by the planters who prophesied disaster for the entire scheme. However, it proved that the far-seeing Ellicott brothers were right. Their mill was finished in 1774. A small town, the nucleus of the present Ellicott City, sprang up around the mill. Their wheat crop was large and good, and the business of manufacturing flour was begun. Records show that the first sales of flour were to W. L. Bowley, owner of a warehouse at Elk Ridge Landing, who each week, for three successive weeks, bought one hundred barrels of flour. In keeping with their purpose and policy of developing the resources of the country, the Ellicotts built, in addition to the mill, a store, a warehouse, various

orchards and nurseries, a school for the children, and a road, ten miles long, from the mill to the manor of Charles Carroll, future signer of the Declaration of Independence. Carroll was induced to grow wheat, as were, one by one, his neighboring planters. They, in order to gain a market for their flour, cooperated with the Ellicotts in prolonging the road to Frederick town, now known as Frederick. In the meantime, Joseph had withdrawn from "Ellicott and Co." in 1774. He moved up the river two miles and at the Falls, tore down Hood's old corn mill and erected a new flour mill and store. This mill, called Ellicott's Upper Mill, was more valuable than the lower one, being situated on the Baltimore-Frederick road. The road, built by the Ellicotts, however, finally became the more traveled one. This reversed the values of the two mills and today no vestige of the Upper Mill remains.

Ellicott Town was the name given to the settlement which grew up about the lower mill. The brothers sold and leased much of their property to men whom they encouraged to erect mills for "the sheathing of copper, the manufacturing of rails, and the slitting of bars". The Ellicotts acquired plaster of paris rock from Nova Scotia, and built a mill for its pulverization into fertilizer dust. Use of this fertilizer greatly increased the quality and quantity of their wheat crop, and soon the dust came into general use throughout Maryland. The town grew into a sizeable manufacturing community and today,

still retains its early appearance and manufacturing activities.

The flour business of "Ellicott and Co." grew apace with the town. In 1783 the supply of wheat had become so large that the Ellicotts prepared to export their flour. To do this, they built a warehouse and wharf in Baltimore on the corner of Pratt and Light Streets. To dredge the river they used "Mud Machines" of their own invention, which operated on the same principles as the modern machines of today. Wagons traveled daily from the mill to the Baltimore wharf, carrying flour for their export trade which flourished. This resulted in the growth of a road which was later to become the National Highway from Baltimore to the West.

The brothers, in 1783, installed in their mill several of their own inventions which revolutionized the process of flour milling. Chief among these were the "Elevator", the "Hopper Boy", and the "Conveyor". It has been calculated that the savings from these improvements, through increase in manufacture and decrease in number of employees, were \$37, 375 annually. In 1787, Ellicott Mills were producing three hundred and twenty barrels of flour a day. Inspired by this example, the milling industry in Maryland grew with astonishing speed. By 1810 there were three hundred and ninety-nine wheat mills in the state, most of them using machinery and processes similar to those used by the Ellicotts. Because of their creation of a demand for wheat

and the milling industry; and their generous contribution of new machinery and methods, the Ellicott brothers have often been justly called "The Fathers of Maryland Milling."

In 1795 John Ellicott died. Andrew Ellicott retired and gave his share in the mills to his three sons, Jonathan, Elias, and George, who in partnership with their cousin John, son of the first owner, continued the operation of the mill. Their store, just across the road from the mill, supplied the residents of Maryland with many imported luxuries which formerly had been lacking in the community. The store and mill became a congregating and stopping place for all the neighbors and travelers on the Baltimore road. The Ellicotts entertained lavishly and were hospitable to an unusual degree. Everyone was free to inspect the mill and its improvements. Oliver Evans, a mathematician and inventor, ^{took advantage} of their generosity by incorporating their inventions in some of his own and patenting them in the state legislature. Later, in 1812 or 1813, he sued them for infringing his patents. The Ellicotts were involved in a costly suit because of their failure to patent their ideas, which they had not done because they preferred that other mill owners, as well as themselves, should benefit by their inventions. Evans lost his suit but retained his patents on the plea of combining the improvements of the Ellicotts. On royalties accruing from millers whom he sued for using his inventions, Evans grew wealthy, while all the Ellicotts, except Jonathan, died leaving modest estates.

In 1809 the original mill building was completely destroyed by fire. A new one was immediately constructed on the same site. In 1812 "Ellicott and Co." was dissolved. Its mill properties were divided, Jonathan retaining the Patapsco mill while Elias, John, and George divided between themselves three mills on Gwinn's Falls. The original mill continued to operate, under the name of "Jonathan Ellicott and Sons", producing "A Superior Article of Family Flour".

The preliminaries to the organization of the Baltimore and Ohio Railway were taking place in Baltimore during the year 1827. Inducements offered by Ellicott Mills and the other manufacturing plants which had grown up around them, probably, were instrumental in securing the laying of the first railroad line in America from Baltimore to the Mills. The line was fifteen miles long and is still in operation, being the first leg of the road from Baltimore to the Ohio River. The road was first opened in June of 1830 and today, supplies the transportation for the Mill's flour to its markets.

The mill property was lost forever to the Ellicott family during the disastrous business panic of 1837. It passed into the hands of Mr. J. L. Carroll, who was a grandson of Charles Carroll, and had been trustee for Jonathan Ellicott. Carroll, in partnership with Mr. C. A. Gambrill, operated the mill. It was probably at this time that the name was changed to the "Patapsco Flouring Mills".

It was in the year of the great flood, 1868, that the mill passed into the hands of Mr. Gambrill alone. The flood was sudden and unexpected. The river had reached a high level from previous rains when early one morning, after a half an hour, during which eighteen inches of water fell, the terror-stricken inhabitants of Ellicott City were confronted with a raging torrent of water which had broken bounds and started on its disastrous course from the upper part of the Patapsco. The mill, its office, and a row of twelve houses were at that time situated on the mill island, formed by the river and the mill race. All twelve of the houses and their thirty-six occupants were swept away by the raging waters. The mill office on the north side of the road was obliterated. On the roof of the mill were five workmen with hastily constructed life-preservers of empty flour barrels. The battering ram of water struck the frame building. Much to the surprise of the terrified onlookers, it withstood the attack of the torrent which had lost much of its force in the destruction of the stone houses. The mill, although much damaged, remained standing and the lives of the workmen were saved.

For four years, the mill remained under the ownership of Mr. Gambrill when, in 1872, it became the property of Mr. R. G. MacGill, who in 1881, sold it to the C. A. Gambrill Manufacturing Co. of Baltimore. While in the hands of that company, and during its World War operation, the building was almost completely burned. The fire occurred in 1917 and rumor was that it was started by a

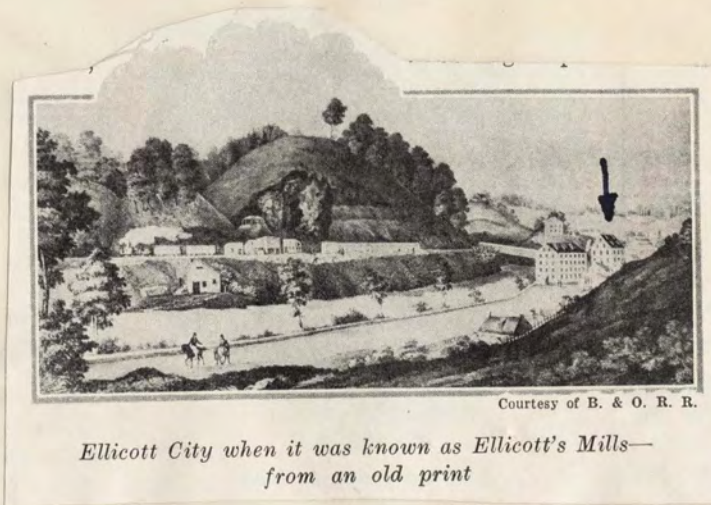
German spy. This, however, seems unlikely when the great chances of accidental firing in a flour mill are considered. The true cause of the fire was probably the accidental ignition of a mixture of flour dust and air. A large, modern, fire-proof building was erected by the Gambrill Co., across the road from the site of the former mill. It combined all the latest machinery and processes resulting in a greatly increased capacity for production. The new plant was bought in 1922 by Morris Schapiro, agent for the Continental Milling Co. On January 1, 1931 the mill changed hands, this time being leased to the Doughnut Machine Corporation who already occupied and operated, in a building as large as the mill proper and adjoining it. With the passage of time and change in ownership of Ellicott Mills there also took place many changes in its machinery, processes, and construction.

CONSTRUCTION OF MILLS

Little is known of the appearance and construction of the original and early mills. Available records refer to the 1774 Mill only as, "a house, one hundred feet long and of proportionate breadth and height, with spacious chambers for storage of grain". What machinery that could not be constructed on the spot had been brought from Pennsylvania. Mill stones, five feet in diameter, were used. The size and type of the water wheel are not known. In 1783 the stones were replaced by new ones, seven feet in diameter, and the machinery, previously

mentioned as being invented by the Ellicotts, was installed to replace hand labor. This machinery consisted of: first, "conveyors" operating on the screw principle in use today, second, "elevators" consisting of belts with small buckets attached which carried the grain above where gravity was utilized in dropping it onto the mill stones, and third, the "hopper boy", an apparatus for cooling the flour by spreading it over a drum of large area. It is claimed that all the machinery except the mill stones were hidden from sight on the second floor. The operation of the plant needed no hand labor. Only personal supervision was necessary, and often the only human being on the premises was a one-armed man who received and discharged all the grain. This story may be a little far-fetched, but in the main, is probably true. All the more probable does it seem when it is known that one of the Ellicotts lost his ~~own~~ arm in an explosion while experimenting with a steam engine of his own invention. He may have been the one-armed man referred to.

The mill erected upon the burning of the first, in 1809, was a frame structure embodying all the improvements installed in the former. A painting of Ellicott City made prior to the flood, and now hanging in the court house, shows the mill as having three stories and a garret. An advertisement, 1854, pictures the same building as having a stone foundation and a railroad siding in front. The only building now standing, remnant of the mill before the 1917 fire, is a frame building shown in Fig. 1.



Photograph (taken from page 13, American Motorist, Oct. 1930) which appears to be a reproduction of a portion of the painting in the Court House, referred to on page 12. The arrow points to the mill.



Figure 1.

West view of frame building. This building is the only one remaining from the 1917 fire.

This building is situated opposite the present mill and east of the road and mill race. It has, at times, been used for the manufacture of barrels and as a packing plant. At present, it is being equipped for use as a feed mill in the manufacture of the various animal feeds now made in the mill proper.

CONSTRUCTION OF PRESENT BUILDING

The present plant was constructed by the Consolidated Engineering Co. of Baltimore. It is of reinforced concrete and the machinery equipment was furnished by Nordyke & Marmon Co., Indianapolis, Indiana. Figure 2 is an architect's drawing of the building as constructed. The small building shown on the left has been removed, and a seven-story building equal in size to the mill proper has been built adjoining the latter. This building was occupied by the Doughnut Machine Corporation prior to their leasing of the entire plant. Together the two buildings are approximately 200 feet long, 40 feet deep, and 100 feet high. The mill proper, which is the right wing, has eight floors and a basement. The basement, however, is not being used.

The first floor contains two adjoining, large rooms which compose the mill office. Across the narrow hall from the office is the testing laboratory, a room in the shape of an "L", wherein are conducted various tests for the purpose of determining the moisture, protein, and gluten content of the wheat. Also on the first floor, but in the center of the building given over to the manufacture of doughnut flour, is the turbine room.



MOLINO DE C. A. GAMBRILL MFG. CO.,
Baltimore, Maryland.

Construido en 1917. Capacidad: 1450 barriles de harina
de trigo por día de 24 horas.

C. A. GAMBRILL MFG. CO.,
Baltimore, Maryland.

Built in 1917. Capacity 1,450 barrels wheat flour
per day of 24 hours.

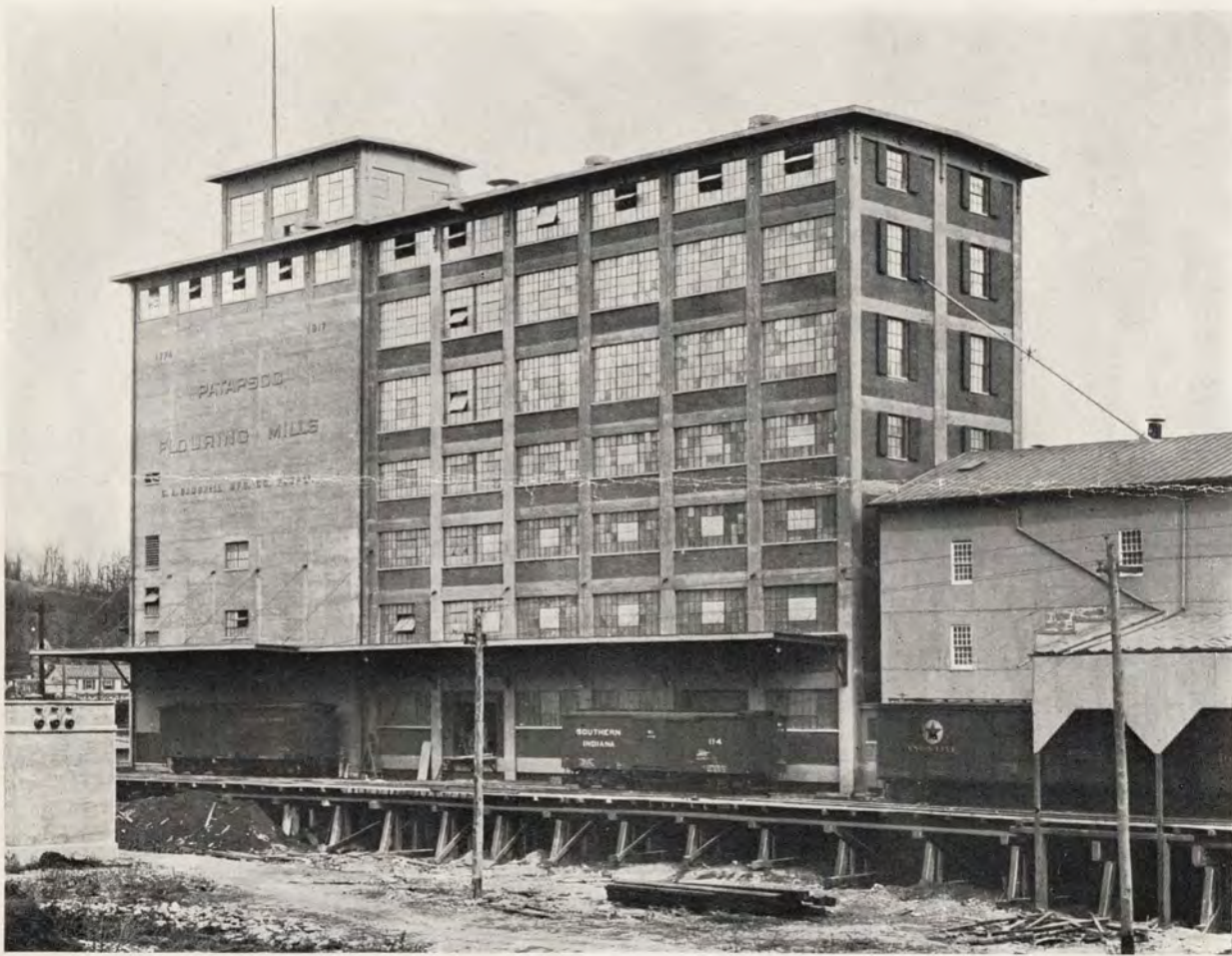
C. A. GAMBRILL MFG. CO.,
Baltimore, Maryland.

Construit en 1917. Capacité en 24 heures: 1450 quintaux
de farine.

CONSOLIDATED ENGINEERING CO.

BUILDING DEPARTMENT

FLOUR MILLS AND GRAIN ELEVATORS



GAMBRILL MFG. CO.
ELLCOTT CITY, MD.

NORDYKE & MARMON, ENGINEERS
MINNEAPOLIS, MINN.



GAMBRILL MILL UNDER CONSTRUCTION

The above combination Flour Mill and Grain Elevator was executed during the winter months of 1916-17. The entire building is of reinforced concrete with minor brick curtain walls in the mill building and was constructed in record-breaking time with the thermometer at no time higher than 20 degrees and at times as low as 10 degrees. The low temperatures were never permitted to interfere with the progress of the work. Sliding wood forms were used in the elevator portion.

*Figure 2A.
Rear View.*

This is a large, square room containing a switch board and two large dynamos mounted on the vertical turbine shafts, (Fig. 3.). When the level of the water is high in the Patapsco River these turbines furnish half the electric power used in the plant. Beneath the turbine room is a water chamber open to the water of the mill race. It is here that the rushing water gives up its kinetic energy to the turning of the turbine shafts, and is converted, by dynamo generation, into electrical energy. Only one turbine is in operation at a time. During the past half year the river water has been so low that no power could be generated at all. Both turbines were out of use and still remain so.

The entire second floor is a packing room. In it are scales and machinery for packing flour and feed into bags and barrels. In the rear of the building, on level with the second floor, and running the length of the building is the loading platform, (Fig. 4). This is a wooden trestle with rails and room for two freight cars side by side. The inside edge of the platform is about a foot and a half from the wall of the building. After the flour has been packed on the second floor it is easily and conveniently loaded into the cars. At the north end of the platform, wheat brought by car, is shoveled directly out of the car door where it falls through the opening between the platform and the building into containers and conveyors which lead to the storage bins. A wooden roof is suspended by wires ^{and brackets} over the loading platform.

On the third floor is situated the immense General



Figure 3.

Dynamo mounted on turbine
shaft.



Figure 4.

North end of loading platform.

Electric induction motor which operates all the machinery in the plant. It is a 440 volt, 60 cycle, 450 horse power motor, at least half of whose power is supplied by the Baltimore Consolidated Gas & Electric Power Co. The remainder of the floor is occupied by the storage bins which run vertically through the building from the second up to the eighth floor. These bins, 70 feet high, are capable of storing one hundred thousand bushels of wheat.

The grinding of the wheat takes place on the fourth floor, where are situated thirty two grinding machines in eight rows, (Figures 5 & 6). These, called roller mills, utilize corrugated rollers in grinding the wheat kernels. The machines in the same row grind to the same size, those in other rows taking up and completing the process, while the remainder grind the shells of the kernels into various sizes for use as feeds. In a smaller room on the same floor are a hammer mill, a cockrell, and a scourer. The first consists of rotating knives which hammer or cut the coats of the wheat into small particles for use as feed, while the latter polishes the finished flour.

The fifth floor contains feed separators which part the feed from the flour by means of a rotating silk-lined reel. The major portion of floor space, however, is given over to the assembly of pipes, chutes, and elevators. The elevators are rectangular pipes containing moving belts, with small buckets or cups attached, which carry up the wheat or flour. They embody the early inventions of the Ellicotts and are now in general use throughout the country. The round pipes lead the falling

NORDYKE DOUBLE ROLLER MILL

Cut 24543

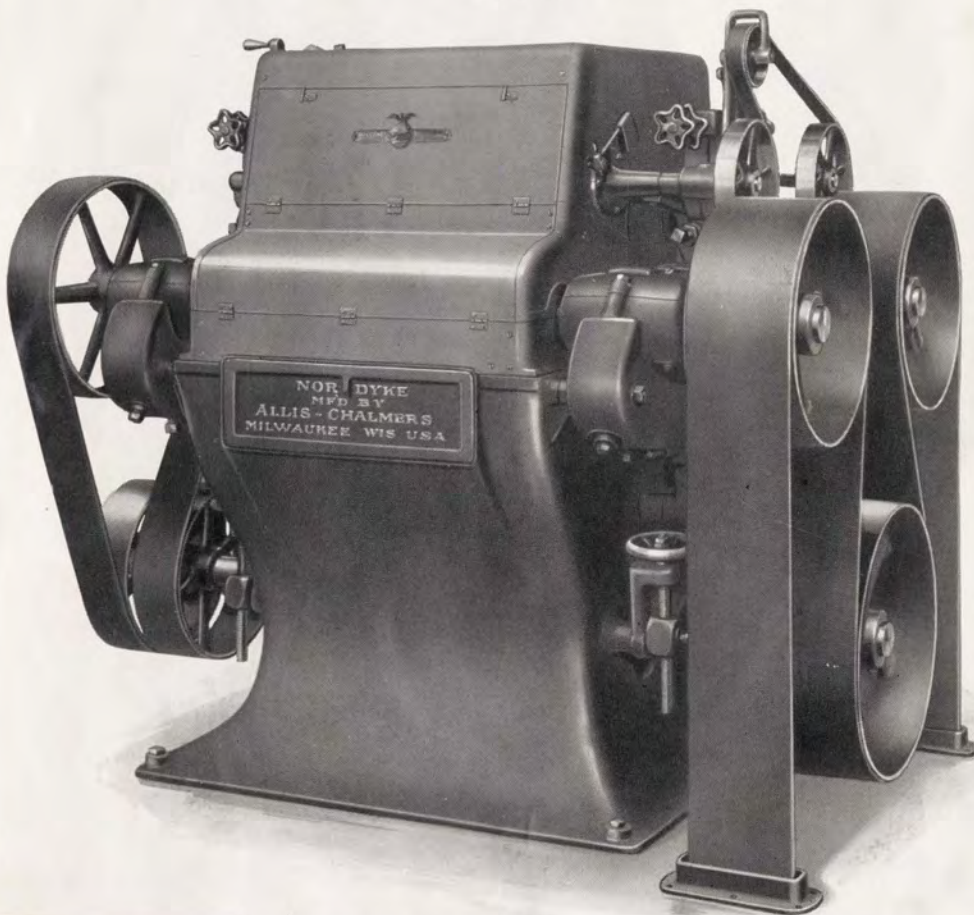
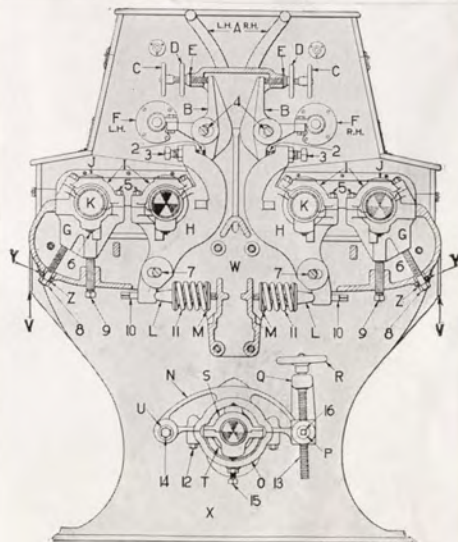


Fig. 5.
Except for a few minor changes in design, this is the machine installed in the mill.



Section through Side Arm of Nordyke Double Roller Mill to show adjustments

Figure 6.

wheat or flour into their proper machines. Figure 7 is an illustration of a small part of the total number of chutes and elevators on the sixth floor.

The sixth floor is occupied by several purefying sifters which separate the flour from its impurities through very fine reels. In addition, there is another scourer, a flour dust collector, a machine for weighing the flour produced, and one for ageing the flour by gas. The latter harmlessly bleaches and matures the flour.

The seventh floor contains eight square sifters, (Figure 8), each one having four compartments. A single sifter separates and finishes the flour or feed taken from an entire row of roller mills on the fourth floor. There are also several purefying sifters similar to those on the floor below.

The eighth floor contains a number of dust collectors. In the large room on the right are the trap doors in the tops of the twenty-four different sized storage bins. The bins vary in capacity from 1500 to 5000 bushels of wheat. There are other bins for the finished flour to be used by the Doughnut Machine Corporation. These bins are on the other side of the building. They are cylindrical and extend from the fifth to the seventh floors. The flour is conveyed to them by screw conveyors and the same method is used in transferring it into the machines in the adjacent plant, where the necessary ingredients for doughnut flour are added and mixed.

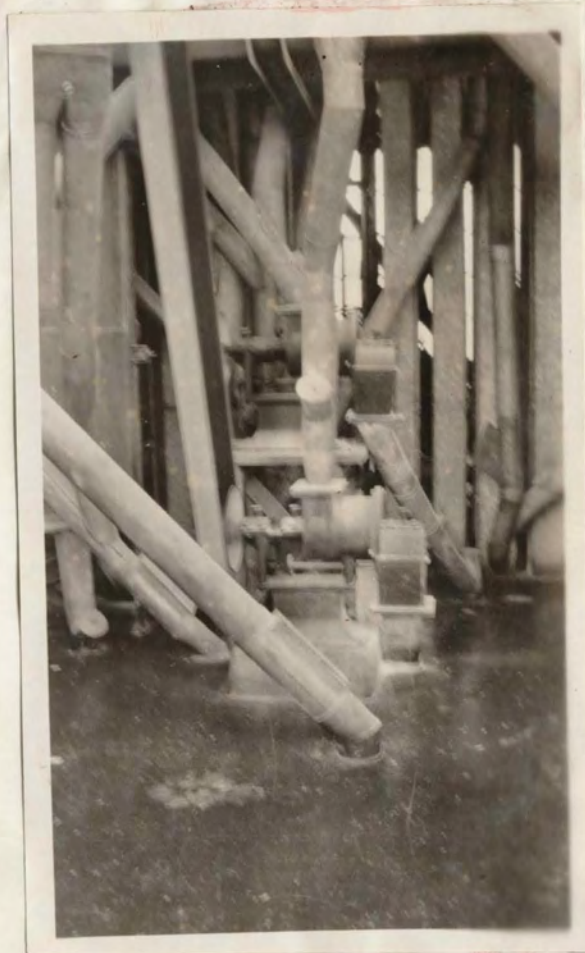


Figure 7.
Collection of chutes and
elevators on sixth floor.



Figure 9.
View showing end of head race. ---



Figure 10.
View showing spillway. ---

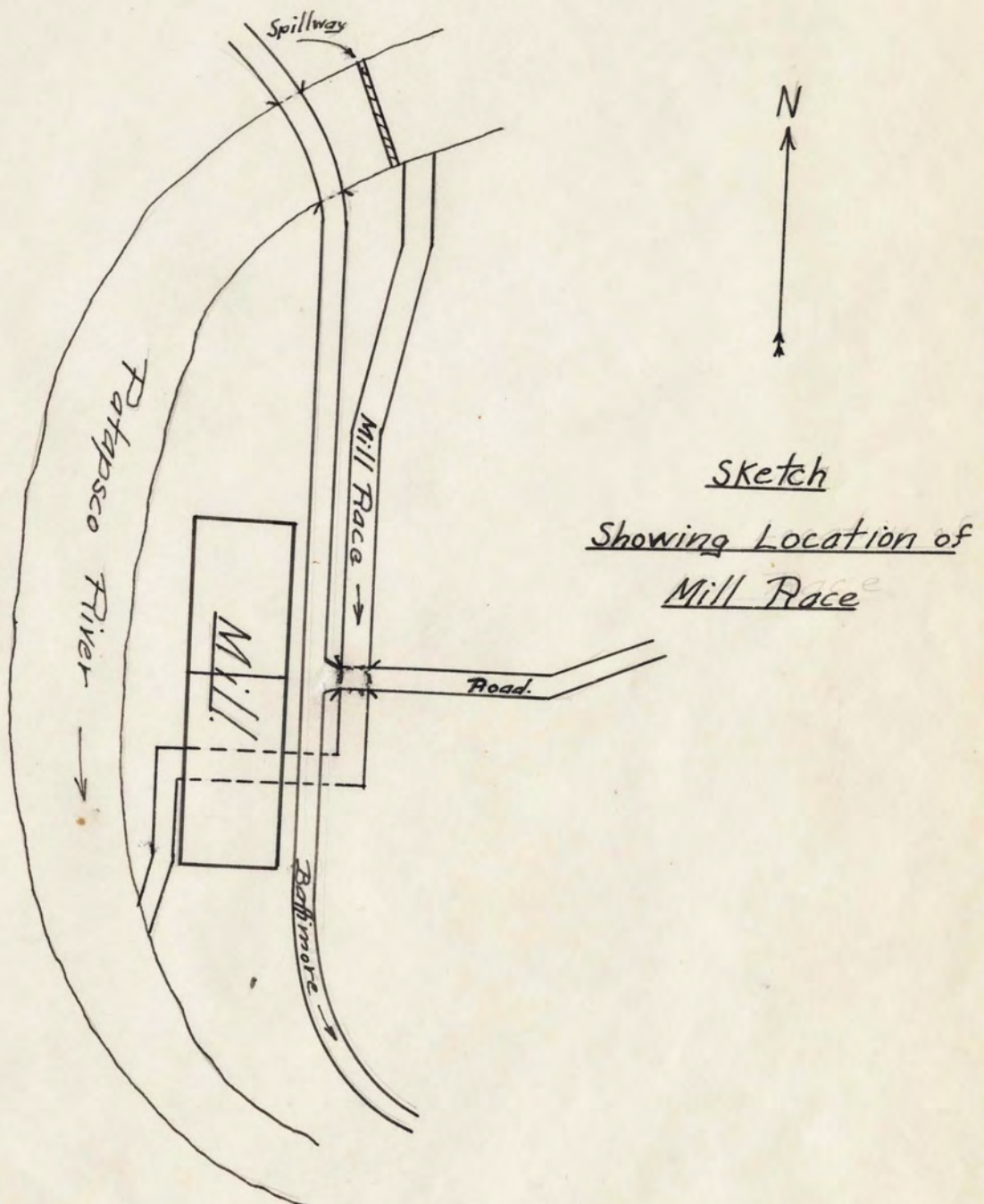


Figure 11.